

Nuclear Diagnostics in Support of ICF Experiments.

M. J. MORAN, Target Area Technologies, Lawrence Livermore National Laboratory. As the yields of Inertial Confinement Fusion (ICF) experiments increase to NIF levels new diagnostic techniques for studying details of fusion burn behavior will become feasible. The new techniques will provide improved measurements of fusion burn temperature and history. Improved temperature measurements might be achieved with magnetic spectroscopy of fusion neutrons. High-bandwidth fusion reaction history will be measured with fusion-specific γ -ray diagnostics. Additional energy-resolved γ -ray diagnostics might be able to study a selection of specific behaviors during fusion burn. Present ICF yields greater than 10^{13} neutrons are sufficient to demonstrate the basic methods that underlie the new techniques. As ICF yields increase, the diagnostics designs adjusted accordingly in order to provide clear and specific data on fusion burn performance. This work was performed under the auspices of the U.S. Department of Energy by the Lawrence Livermore National Laboratory under Contract number W-7405-ENG-48.

Note: This is an invited paper.